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(71) Applicant: THE COCA-COLA COMPANY [US/US]; One Coca-Cola Plaza, N.W., Atlanta, GA 30303 (US).

(72) Inventors: PLESTER, George; Chausse de Mons 1424, B-1070 Brussels (BE). VAN ESCH, Willy; Lange lo Straat 43, B-3212 Pellenberg (BE).

(74) Agents: PAPPAS, Peter, G. et al.; Jones & Askew, LLP, 2400 Monarch Tower, 3424 Peachtree Road, N.E., Atlanta, GA 30326 (US).

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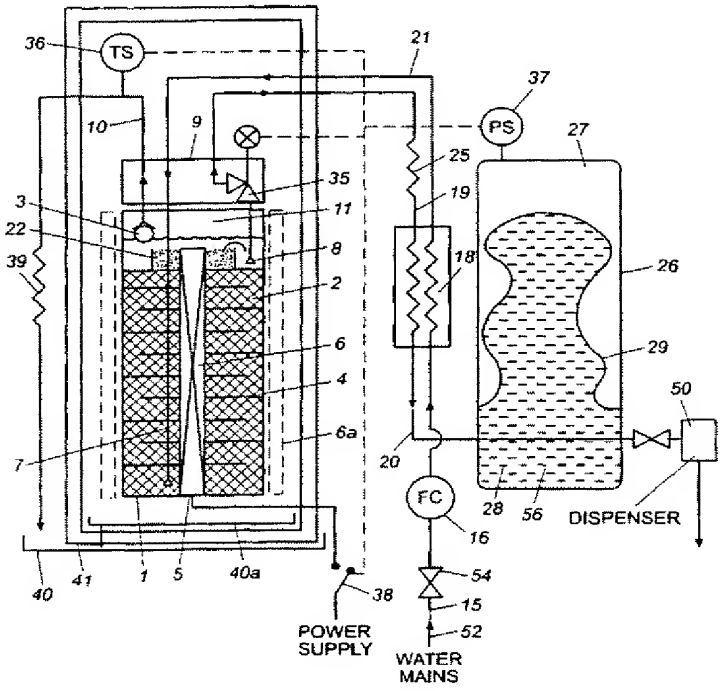
(54) Title: ON PREMISE WATER TREATMENT SYSTEM AND METHOD



(57) Abstract: A water treatment method uses a removable, disposable cartridge (2) having an internal mesh structure. A disposable heater (6) heats water fed to the cartridge. Precipitated solids collect on the mesh surface provided temperature and residence time are appropriately maintained. The heat breaks down the bicarbonate hardness of the water thereby depositing carbonates on the mesh surface and heavy metals will be codeposited due to the resultant change in pH. The cartridge has a head-space (11) for collecting entrained gases such as volatile organic compounds, chlorine and air. Water sterility is achieved by heating the water over an appropriate period of time. Turbidity is removed within the cartridge due to settling induced by the low fluid velocity controlled by a controller and by a filter provided at the outlet of the cartridge. The filter will become blocked when bicarbonate hardness is carried over forcing a user to replace a spent cartridge. Heat economy and a cool treated water outlet stream are secured by use of a heat exchanger (18). Water is fed from the cartridge, through an intercooler and the heat exchanger to a storage tank (26). Water in the storage tank is kept out of contact with air by a movable barrier. Eventually, the water is fed from the storage tank to a dispenser (50) and can subsequently be used in a post-mix beverage dispenser. A visual display indicates the status of the water treatment system.

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AMENDED CLAIMS
[received by the International Bureau on 12 February 2001 (12.02.01); original claims 1-44 replaced by new claims 1-42 (7 pages)]

1. A system for treating water comprising:

a housing defining a water treatment chamber and having a water inlet for receiving untreated water and a water outlet for discharging treated water;

a water submersible heater disposed in the housing so that the heater is in direct contact with the water in the water treatment chamber, the heater operable for heating the water sufficiently to convert dissolved impurities in the untreated water to solid precipitates and gases; and

a collector disposed in the housing for collecting the solid precipitates deposited from the water.

2. A system for treating water as in claim 1 further comprising a gas outlet for discharging the gases from the housing.

3. A system for treating water as in claim 1 further comprising a storage tank to receive water from the water outlet of the housing.

4. A system for treating water as in claim 1 further comprising providing a collapsible water container for keeping the water stored in the storage tank out of contact with air or other gases in a head-space of the storage tank.

5. A system for treating water as in claim 1 wherein the heater is an electrical heater.

6. A system for treating water as in claim 1 wherein the housing, collector, and heater form a disposable unit which can be disengaged from the system and replaced.

7. The system of claim 1 further comprising:

a water cooler for receiving treated water from the housing water outlet; and

a fan for forcing air past the water cooler to cool the treated water in the water cooler.

8. A system for treating water as in claim 7 further comprising a gas outlet for discharging the gases from the housing and a condenser for receiving the gases discharged from the gas outlet, the fan positioned for forcing air past the condenser to cool the gases in the condenser.

9. A system for treating water as in claim 7 further comprising a heat exchanger for exchanging heat between treated water discharged from the water cooler and untreated water being fed into the housing.

10. A system for treating water as in claim 7 wherein the cooler comprises a coiled pipe.

11. A system for treating water as in claim 9 wherein the condenser comprises a coiled pipe.

12. A method for treating water comprising:

feeding untreated water into a water treatment chamber defined by a housing through a water inlet in the housing;

heating the untreated water fed into the water treatment chamber with a water submersible heater disposed in the water treatment chamber so that the water directly contacts the heater, the water being heated sufficiently to convert dissolved impurities in the untreated water to solid precipitates and gases; and

collecting the solid precipitates deposited from the water onto a collector disposed in the housing; and

discharging treated water from the housing through a water outlet in the housing.

13. A method for treating water as in claim 12 further comprising discharging the gases from the housing through a gas outlet in the housing.

14. A method for treating water as in claim 12 further comprising discharging treated water from the water outlet of the housing into a storage tank.

15. A method for treating water as in claim 14 further comprising providing a collapsible water container for keeping the water stored in the storage tank out of contact with air or other gases in a head-space of the storage tank.

16. A method for treating water as in claim 12 wherein the heater is an electrical heater.

17. A method for treating water as in claim 12 wherein the housing, collector, and heater form a disposable unit, and the method further comprises disengaging the disposable unit from the system and replacing the disposable unit.

18. A method for treating water as in claim 12 further comprising:

feeding treated water from the housing water outlet through a water cooler; and

forcing air past the water cooler to cool the treated water in the water cooler.

19. A method for treating water as in claim 18 further comprising discharging the gases from the housing through a gas outlet and a condenser, and forcing air past the condenser to cool the gases in the condenser.

20. A method for treating water as in claim 18 further comprising exchanging heat in a heat exchanger between treated water discharged from the water cooler and untreated water being fed into the housing.

AMENDED SHEET (ARTICLE 19)

21. A method for treating water as in claim 18 wherein the cooler comprises a coiled pipe.

22. A method for treating water as in claim 19 wherein the condenser comprises a coiled pipe.

23. A system for treating water comprising:

a housing defining a water treatment chamber and having a water inlet for receiving untreated water and a water outlet for discharging treated water;

a heater for heating the water sufficiently to convert dissolved impurities in the untreated water to solid precipitates and gases,

a collector disposed in the housing for collecting a first portion of the solid precipitates deposited from the water: and

a polyester wool filter disposed in the housing for collecting a second portion of the solid precipitates deposited from the water, the water first flowing through the collector and then through the filter, the filter having a shorter useful life than the collector so that the filter becomes blocked with the precipitates before the collector becomes blocked with the particulates.

24. A method for treating water comprising:

feeding untreated water into a water treatment chamber defined by a housing through a water inlet in the housing;

heating the water with a heater sufficiently to convert dissolved impurities in the untreated water to solid precipitates and gases; and

collecting a first portion of the solid precipitates deposited from the water on a collector disposed in the housing;

collecting a second portion of the solid precipitates on a polyester wool filter disposed in the housing deposited from the water, the water first flowing through the collector and then through the filter, the filter having a shorter useful life than the collector so that the filter becomes blocked with the precipitates before the collector becomes blocked with the particulates; and

discharging treated water from the housing through a water outlet in the housing.

AMENDED SHEET (ARTICLE 19)

25. A system for treating water comprising:

a housing defining a water treatment chamber and having a water inlet for receiving untreated water and a water outlet for discharging treated water;

a heater for heating the water in the water treatment chamber sufficiently to convert dissolved impurities in the untreated water to solid precipitates and gases;

a collector disposed in the housing for collecting the solid precipitates deposited from the water;

a reservoir to receive treated water discharged from the water outlet of the housing;

a fine filter disposed in the housing for filtering precipitates from the water in the housing; and

a visual display for indicating any one or more of a plurality of possible statuses of the system, wherein at least one status includes the level of precipitate blockage in the fine filter.

26. A system for treating water as in claim 25 wherein the visual display comprises a plurality of lights for indicating the status of the system.

27. A system for treating water as in claim 25 wherein the statuses include the level of water in the housing.

28. A system for treating water as in claim 27 wherein the visual display indicates when the water in the housing is below a predetermined level.

29. A system for treating water as in claim 27 wherein the visual display indicates when the water in the housing is above a predetermined level.

30. A system for treating water as in claim 27 further comprising a water level sensor disposed in the housing for communicating to the visual display the water level in the housing.

31. A system for treating water as in claim 25 wherein the statuses include the level of water in the reservoir

32. A system for treating water as in claim 31 wherein the visual display indicates when the water in the reservoir is below a predetermined level.

33. A system for treating water as in claim 31 further comprising a water level sensor disposed in the reservoir for communicating to the visual display the water level in the reservoir.

34. A system for treating water as in claim 25 wherein the statuses include treated water discharge status.

35. A system for treating water as in claim 34 wherein the visual display indicates when the housing discharges treated water.

36. A system for treating water as in claim 25 wherein the statuses include system cooling status.

37. A system for treating water as in claim 36 further comprising a switch for turning the heater off while unheated water flows through the system to cool the system.

38. A system for treating water as in claim 36 wherein the visual display indicates when the water in the housing is below a predetermined temperature.

39. A system for treating water as in claim 38 further comprising an enclosure, the housing disposed in the enclosure, a door for providing access to the enclosure, a lock which selectively locks the door when the water in the housing is at least the predetermined temperature, and alternatively, unlocks the door when the water in the housing is below the predetermined temperature.

40. A system for treating water as in claim 25 wherein the statuses include the level of water in the housing, the level of water in the reservoir, the temperature of the water in the water treatment chamber, the level of blockage in the housing, treated water discharge status, system power on/off status, and system cooling status.

41. A method for treating water comprising:

feeding untreated water into a water treatment chamber defined by a housing through a water inlet in the housing;

heating the water in the water treatment chamber sufficiently to convert dissolved impurities in the untreated water to solid precipitates and gases;

collecting the solid precipitates deposited from the water on a collector disposed in the housing;

discharging treated water from the housing through a water outlet in the housing;

collecting treated water discharged from the water outlet of the housing in a reservoir;

filtering precipitates from the water in the housing using a fine filter disposed in the housing; and

visually displaying any one or more of a plurality of possible statuses of the system, wherein at least one status includes the level of precipitate blockage in the fine filter.

42. A method for treating water as in claim 41 wherein the step of visually displaying comprises indicating the one or more statuses of the system with a plurality of lights.